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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/516,907	PADDOCK ET AL.	
	Examiner	Art Unit	
	Joseph Saunders	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) *1-5,12-14,19-26,33 and 34* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-11,15-18 and 27-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12-3-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. This communication is responsive to the provisional election made with traverse on November 17, 2008 to prosecute the invention of Group II, claims 6 – 11, 15 – 18, and 27 – 32. Other groups, including claims 1 – 5, 12 – 14, 19 – 26, 33, and 34 are withdrawn from further consideration, as being drawn to a non-elected invention. A complete reply to a future final office action must include cancellation of non-elected claims or other appropriate action (37 CFR 1.144). See MPEP § 821.01.

2. Applicant's election with traverse of Group II Claims 6 – 11, 15 – 18, and 27 - 32 in the reply filed on November 17, 2008 is acknowledged. The traversal is on the ground(s) that "claims in Groups I-IV are technically interrelated and belong to a general concept, namely, methods and systems for enhancing audio data," and while it is true that the common concept between the invention is to provide an enhanced signal, this subject matter is neither novel nor inventive, and therefore cannot be seen as a common inventive concept between these different independent inventions. Further Applicant argues, "In particular, these methods and systems contain two special technical features: (i) pre-emphasizing frequencies and dynamics expected to be lost or distorted, as well as (ii) recovering frequencies and dynamics preserved by pre-emphasis of the frequencies and dynamics, wherein the frequencies and dynamics expected to be lost or distorted in (i) and (ii) are due at least in part to compression and transmission. Claim 1 in Examiner's Group I recites explicitly the technical

features (i) and (ii). Each of the independent claims 6, 12, 15, 18, 19, 25, 27, 33, and 34, and their respective dependent claims recite elements (i) and/or (ii) described above," page 2 of Applicant's reply. This is not found persuasive because while Group I which includes independent claim 1 as indicated by the Examiner in the restriction requirement recites the special technical features argued above, the rest of the independent claims do not as indicated in the restriction requirement,

"Group I, claim(s) 1 - 5, drawn to a method for enhancing transmitted audio data, comprising digital coding, pre-emphasis, transmission, decoding, and de-emphasis.

Group II, claim(s) 6 - 11, 15 - 18, and 27 -32, drawn to a method and corresponding apparatus for distinctly processing a received audio signal in multiple bands, combining the processed bands, and applying further processing to the combined audio signal.

Group III, claim(s) 12 - 14, drawn to a method for correcting the acoustic response of a listening environment by measuring the impulse response of the environment and deriving and employing a corresponding compensatory process.

Group IV, claim(s) 19 - 26, 33, and 34, drawn to a method and corresponding apparatus for creating a difference in dynamics among sound streams and adding predictable environmental characteristics".

In particular, with regards to Applicant's elected Group II, none of claims 6 - 11, 15 - 18, and 27 - 32 even mention pre-emphasizing frequencies and

dynamics expected to be lost or distorted, and recovering frequencies and dynamics preserved by pre-emphasis of the frequencies and dynamics. The claims only state that multi-band processing, recombination, and applying subsequent processing occurs to enhance an audio signal, which is not shared by any other group.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

3. The information disclosure statement filed December 3, 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 6 – 11 and 15 – 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Claesson et al. (2002/0075965 A1), hereinafter Claesson.

Claim 6: Claesson discloses a method for enhancing audio signals ("Digital Signal Processing Techniques for Improving Audio Clarity and Intelligibility"), comprising: receiving an audio signal ("in", Figure 10a); separating the audio signal into component signals corresponding to discrete bands ("Indeed, as can be seen in FIG. 10a, the input samples are pre-processed in one of four parallel paths," [0075]); processing one or more of the component signals with distinct processing pathways, resulting in processed component signals (AGC and SP. AGC, Figure 10a); aggregating the processed component signals to recreate a standard signal in one or more channels ("It should also be noted that, with some exceptions noted below, the processing blocks of processor 1000 operate in a similar manner to the corresponding blocks of processors 30 and 900 described above," [0075] and therefore a mixer similar to Mixer 42 of processor 30 would

be responsible for the combined signal entering block "To crossovers" of Figure 10a. resulting in the Pre-processed audio, Figure 10b); and performing additional post-processing (Figure 10b) on the standard signal to mask artifacts and response anomalies introduced by a codec and equipment used, resulting in an enhanced audio signal ("As the bandwidth of encoders are reduced relative to the bandwidth of the original audio, undesirable audible artifacts are generated. The present invention processes the audio samples such that these anticipated artifacts become less noticeable to the human ear. That is, the signal processing of the present invention allows a low bit rate encoder to be used to encode an audio stream without suffering overly much from the undesirable artifacts created by trying to faithfully reproduce a high bandwidth signal (the original audio) with a low bandwidth system (the low bit rate codec). In addition to facilitating the bandwidth savings represented by low bit rate encoders, the signal processing of the present invention may have other desirable effects such as, for example, the improvement of clarity in the presence of background noise and cut-to-cut evenness," [0058] – [0059]).

Claim 7: Claesson discloses a method according to claim 6, wherein the audio signal is a compressed audio signal ("MP3 encoding scheme," [0049]).

Claim 8: Claesson discloses a method according to claim 6, wherein the separating step separates the audio signal into at least one full bandwidth

component signal ("wideband," Figure 10a) and at least one limited bandwidth component signal (LP and HP signal via 2-way crossover 200hz, Figure 10a).

Claim 9: Claesson discloses a method according to claim 8, wherein the at least one limited bandwidth component signal comprises at least one of: a bass component signal, a midrange component signal, and a treble component signal (LP and HP signal via 2-way crossover 200hz, Figure 10a).

Claim 10: Claesson discloses a method according to claim 6, wherein the post-processing comprises at least one of: 3D/live enhancement for adding life and stereo perspective to the sound field of the enhanced audio signal; recording environment simulation for adding diffusion, reverb, depth, regeneration, and room decay to the enhanced audio signal; voice elimination for reducing vocals in the enhanced audio signal; wide stereo enhancement for adding wider stereo perspective to the sound field of the enhanced audio signal; parametric equalization for providing broad spectrum shaping of the enhanced audio signal; filtering the enhanced audio signal to reinforce subwoofer and bass frequencies; wall simulation for producing time delays that simulate reflections from a stage; room simulation for producing time delays that simulate natural room acoustics; karaoke enhancement for removing equal energy components from left and right signal channels; vocal enhancement for clarifying vocal features; subsonic enhancement for low-bass reinforcement of the enhanced audio signal; and look-ahead automatic gain control for controlling output dynamic range ("To deal with

this, NATLs 1080-1084 look at future samples and limit the gain of the current sample to avoid the distortion associated with such sharp overshoots," [0080]).

Claim 11: Claesson discloses a method according to claim 6, wherein the post-processing includes room simulation for compensating for poor room acoustics in a listening environment for the enhanced audio signal ("For example, playback device 130 might be part of an audio system located inside a user's car, the dynamic processing capabilities of the invention being employed to improve the quality of sound in the presence of the background noise typical in such an environment," [0051]).

Claim 15: Claesson discloses a system for enhancing audio signals ("Digital Signal Processing Techniques for Improving Audio Clarity and Intelligibility"), comprising: a full bandwidth pathway for processing a full bandwidth component of an audio signal ("wideband," Figure 10a), the full bandwidth pathway producing a processed full bandwidth signal (via SP. AGC); at least one limited bandwidth pathway for processing a limited bandwidth component of the audio signal (LP and HP signal via 2-way crossover 200hz, Figure 10a), the limited bandwidth pathway producing a processed limited bandwidth signal (via AGC and SP. AGC, Figure 10a); a mixer configured to combine the processed full bandwidth signal and the processed limited bandwidth signal to create a mixed audio signal ("It should also be noted that, with some exceptions noted below, the processing blocks of processor 1000 operate in a similar manner to the

corresponding blocks of processors 30 and 900 described above," [0075] and therefore a mixer similar to Mixer 42 of processor 30 would be responsible for the combined signal entering block "To crossovers" of Figure 10a. resulting in the Pre-processed audio, Figure 10b); and one or more post-processing elements (Figure 10b) for further enhancement of the mixed audio signal ("As the bandwidth of encoders are reduced relative to the bandwidth of the original audio, undesirable audible artifacts are generated. The present invention processes the audio samples such that these anticipated artifacts become less noticeable to the human ear. That is, the signal processing of the present invention allows a low bit rate encoder to be used to encode an audio stream without suffering overly much from the undesirable artifacts created by trying to faithfully reproduce a high bandwidth signal (the original audio) with a low bandwidth system (the low bit rate codec). In addition to facilitating the bandwidth savings represented by low bit rate encoders, the signal processing of the present invention may have other desirable effects such as, for example, the improvement of clarity in the presence of background noise and cut-to-cut evenness," [0058] – [0059]).

Claim 16 is substantially similar in scope to claim 9 and therefore is rejected for the same reasons.

Claim 17 is substantially similar in scope to claim 10 and therefore is rejected for the same reasons.

Claim 18: Claesson discloses a apparatus for playback of digital audio files (Figures 12a, 12b, and 14), said apparatus comprising: a digital audio signal source (CD Player, FM Radio, MP3 Player, Figure 14); at least one processor coupled to the digital audio signal source ("As shown, receiver 1408 includes a signal processor 1414 designed according to the present invention which may be configured to eliminate the unevenness resulting from the differences between the audio sources, and which allows the user to customize the listening experience according to his preferences," [0104]), said at least one processor being configured to carry out a method ("Digital Signal Processing Techniques for Improving Audio Clarity and Intelligibility") comprising: receiving an audio signal from the digital audio signal source ("in", Figure 10a); separating the audio signal into component signals corresponding to discrete bands ("Indeed, as can be seen in FIG. 10a, the input samples are pre-processed in one of four parallel paths," [0075]); processing one or more of the component signals with distinct processing pathways, resulting in processed component signals (AGC and SP. AGC, Figure 10a); aggregating the processed component signals to recreate a standard signal in one or more channels ("It should also be noted that, with some exceptions noted below, the processing blocks of processor 1000 operate in a similar manner to the corresponding blocks of processors 30 and 900 described above," [0075] and therefore a mixer similar to Mixer 42 of processor 30 would be responsible for the combined signal entering block "To crossovers" of Figure 10a. resulting in the Pre-processed audio, Figure 10b); and performing additional

post-processing (Figure 10b) on the standard signal to mask artifacts and response anomalies introduced by a codec and equipment used, resulting in an enhanced audio signal ("As the bandwidth of encoders are reduced relative to the bandwidth of the original audio, undesirable audible artifacts are generated. The present invention processes the audio samples such that these anticipated artifacts become less noticeable to the human ear. That is, the signal processing of the present invention allows a low bit rate encoder to be used to encode an audio stream without suffering overly much from the undesirable artifacts created by trying to faithfully reproduce a high bandwidth signal (the original audio) with a low bandwidth system (the low bit rate codec). In addition to facilitating the bandwidth savings represented by low bit rate encoders, the signal processing of the present invention may have other desirable effects such as, for example, the improvement of clarity in the presence of background noise and cut-to-cut evenness," [0058] – [0059]); and one or more speaker drivers coupled to the processor, the one or more speaker drivers being configured to drive one or more speakers for playback of the enhanced audio signal ("These audio signals may be received by a receiver 1408 which amplifies them using power amp 1410 which drives speakers 1412," [0104]).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to

be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 27 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claesson in view of Anderson (US 4,396,806), hereinafter Anderson.

Claim 27: Claesson discloses a system for enhancing audio signals ("Digital Signal Processing Techniques for Improving Audio Clarity and Intelligibility"), comprising: a full bandwidth pathway for processing a full bandwidth component of an audio signal ("wideband," Figure 10a), the full bandwidth pathway producing a processed full bandwidth signal (via SP. AGC), at least one limited bandwidth pathway for processing a limited bandwidth component of the audio signal (LP and HP signal via 2-way crossover 200hz, Figure 10a), the limited bandwidth pathway producing a processed limited bandwidth signal (via AGC and SP. AGC, Figure 10a), and a mixer configured to combine the processed full bandwidth signal and the processed limited bandwidth signal to create a mixed audio signal ("It should also be noted that, with some exceptions noted below, the processing blocks of processor 1000 operate in a similar manner to the corresponding blocks of processors 30 and 900 described above," [0075] and therefore a mixer similar to Mixer 42 of processor 30 would be responsible for the combined signal entering block "To crossovers" of Figure 10a. resulting in the Pre-processed audio, Figure 10b).

Claesson does not disclose the full bandwidth pathway comprising: a first input amplifier having an input for the audio signal, a first output amplifier having

an output for the processed full bandwidth signal, and a first compressor connected between the first input amplifier and the first output amplifier; and further does not disclose the at least one limited bandwidth pathway comprising: a second input amplifier having an input for the audio signal, a second output amplifier having an output for the processed limited bandwidth signal, a second compressor connected between the second input amplifier and the second output amplifier, and a filter connected between the second input amplifier and the second output amplifier. Claesson does state, "A generalized topology of the present invention includes three different kinds of blocks, AGCs (including NATLs), drive blocks (e.g., drive blocks 46, 50 and 54 of FIG. 1b), and filter blocks (e.g., crossovers 36 and 44 of FIG. 1a). Signal processing networks combining these three elements in any of a wide variety of ways are considered within the scope of the invention. As described above, filter or crossover blocks typically are employed to perform a series of linear operations to separate signals into overlapping frequency bands," [0060]. Anderson discloses an audio signal processing topology similarly comprising voltage-controlled amplifiers, filtered channels, and compressors for improving sound characteristics, and therefore within the scope of Claesson's invention. Anderson specifically teaches an input signal is processed in parallel channels, "Each channel comprises, in order, a first voltage-controlled amplifier 80, a bandpass filter 82 centered at the channel frequency, which may be for example 100 to 200 Hz first channel 26 with a center frequency at 150, and 200 to 400 Hz in second channel 27 with the center frequency at 300 Hz. Thereafter, the channel includes a voltage-controlled

limiter or compressor 84 followed by a second bandpass filter 86 which in turn is followed by a second voltage-controlled amplifier 88. The outputs of the second voltage controlled amplifier 88 are mixed into a single channel, for example, at the input to a buffer amplifier 90, and fed through an output line 56 to the output amplifier 14 and thereafter to a speaker 16," Column 5 Lines 1 – 13 and Figure 3.

Anderson goes on to explain the advantages of this particular order, "Of particular interest is the order of the circuit elements in the channels 26, 27. The first voltage-controlled amplifier 80 is operative to amplify all applied signals to a level which will characterize the channel. The bandpass filter 82 which characterizes the channel passes only those frequencies within the defined channel range and attenuates all other signals, including any distorted signals introduced by the amplifier 80 outside the channel spectrum. The output of the bandpass filter 82 is coupled to the voltage-controlled compressor 84. The compressor 84 provides the amplitude limiting function for the channel, thus minimizing the possibility that amplified sounds will cause pain to the user. The output of the compressor 84 is applied to a bandpass filter 86 which is of substantially the same design as the first bandpass filter 82 in its response characteristic to eliminate harmonic distortion or undesired effects caused by the voltage-controlled compressor 84. The output of the bandpass filter 86 is then applied to the input of a second voltage-controlled amplifier 88. The voltage-controlled amplifier 88 permits the final selection of the audio sound level in the spectrum of the channel best suited to the taste of the user. The output of the

second voltage-controlled amplifier 88 is thereafter mixed with the outputs of all other channels.

In summary, the first amplifier 80 provides initial amplitude adjustment to match the characteristics of the compressor so that all input signals within the selected range of the channel are within the audio range of the listener, the second amplifier 88 provides fine control of amplitude, and the bandpass filters 82 and 86 characterize the channel. The placement of the bandpass filters 82 and 86 are selected to minimize noise caused by distortion. The levels and amplitudes of the amplifiers 80 and 88 and the compressor 84 are controlled by a voltage level," Column 5 Lines 14 - 49.

Therefore given the similarity between the processing technique disclosed by Claesson and Anderson, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the processing blocks in order as disclosed by Anderson, in the parallel processing paths disclosed by Claesson, i.e., the wideband and band limited paths, thereby allowing for the aforementioned advantages disclosed by Anderson, resulting in improved sound characteristics.

Claim 28: Claesson and Anderson disclose a system according to claim 27, further comprising one or more post-processing elements (Claesson Figure 10b) for further enhancement of the mixed audio signal ("As the bandwidth of encoders are reduced relative to the bandwidth of the original audio, undesirable audible artifacts are generated. The present invention processes the audio

samples such that these anticipated artifacts become less noticeable to the human ear. That is, the signal processing of the present invention allows a low bit rate encoder to be used to encode an audio stream without suffering overly much from the undesirable artifacts created by trying to faithfully reproduce a high bandwidth signal (the original audio) with a low bandwidth system (the low bit rate codec). In addition to facilitating the bandwidth savings represented by low bit rate encoders, the signal processing of the present invention may have other desirable effects such as, for example, the improvement of clarity in the presence of background noise and cut-to-cut evenness," Claesson [0058] – [0059]).

Claim 29: Claesson and Anderson disclose a system according to claim 27, wherein at least one of the first input amplifier, the first output amplifier, the second input amplifier, and the second output amplifier is a variable gain amplifier ("voltage-controlled amplifier," Anderson Figure 3)

Claim 30: Claesson and Anderson disclose a system according to claim 27, wherein the at least one limited bandwidth pathway comprises at least one of: a bass pathway for processing a bass component of the audio signal; a midrange pathway for processing a midrange component of the audio signal; and a treble pathway for processing a treble component of the audio signal (LP and HP signal via 2-way crossover 200hz, Claesson Figure 10a).

Claim 31: Claesson and Anderson disclose a system according to claim 30, wherein: for the bass pathway, the filter is a low-pass filter; for the midrange pathway, the filter is a band-pass filter; and for the treble pathway, the filter is a high-pass filter (LP and HP signal via 2-way crossover 200hz, Claesson Figure 10a).

Claim 32: Claesson and Anderson disclose a system according to claim 27, further comprising a pre-compressor configured to receive an input audio signal and to generate the audio signal as a compressed representation of the input audio signal (Figure 10 b of Claesson illustrates a pre-compressor or NATLs 1 – 5 performing pre-compression on the input audio signal before mixing and subsequent compression from NATL 1092).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Saunders whose telephone number is (571) 270-1063. The examiner can normally be reached on Monday - Thursday, 9:00 a.m. - 4:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. S./
Examiner, Art Unit 2614
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